

**STATUS AND DISTRIBUTION OF THE SHIELDBUG
ODONTOSCELIS FULIGINOSA (L.) AND SEEDBUG
PIONOSOMUS VARIUS (WOLFF) (HEMIPTERA: HETEROPTERA)
ASSOCIATED WITH BARE AND PARTIALLY-VEGETATED
DUNES ON THE CASTLEMARTIN PENINSULA**

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ABSTRACT

The shield bug *Odontoscelis fuliginosa* (L.) and seed bug *Pionosomus varius* (Wolff) were searched for on bare, and partially-vegetated ground, at five sand dune complexes on the Castlemartin Peninsula, Pembrokeshire. Third instar nymphs and adults of *Odontoscelis* were recorded from 20 locations at six sites. Adults and fifth instar nymphs of *Pionosomus* were recorded from 13 locations at four sites. The habitat requirements of both species are described and their distributions are mapped.

INTRODUCTION

The dune systems on Castlemartin Peninsula, south-west Wales, support rich assemblages of heteropteran bugs and are the UK foci for the shieldbug *Odontoscelis fuliginosa* (L.) (Hemiptera: Scutelleridae) and the Red Data Book 3 seedbug *Pionosomus varius* (Wolff) (Hemiptera: Lygaeidae) (Plate 1, Figs 2 & 3, respectively) (Kirby, 1992a & b; Howe, 2004). These two species are important components of the invertebrate assemblages which are SSSI qualifying features at Stackpole and Castlemartin Coast. They are associated with bare and partially-vegetated sand which supports their preferred foodplants. As much of this habitat has been lost in recent years to fixed dune grassland, primarily because of changes in grazing regimes, land use and most significantly, reduced rabbit populations, they are potentially under threat. For this reason, a survey was undertaken to assess the extent of bare ground available and the current status and distribution of the two associated rare bug species.

The ground-dwelling shieldbug *O. fuliginosa* is widely distributed in Europe, from Spain to Sweden and eastwards to Russia (Stichel, 1957–1959). In the UK it forms small, discrete colonies, burrowing in sand close to the roots of Stork's-bill *Erodium* spp. on open semi-fixed dunes. There are no modern records from former sites in Cheshire, Cornwall, Hampshire, Norfolk and Suffolk, and the shieldbug now appears to be restricted to Sandwich Bay in Kent and the Castlemartin Peninsula (Kirby, 1992a). It was first recorded in Wales from the Castlemartin Peninsula at Freshwater West in 1938 and the last British records for it were from Barafundle Bay (Stackpole NNR) and Broomhill Burrows in 1990. It has also been recorded from Mere Pool Valley on Stackpole NNR (Howe, 2004). Boyce (2001) considered Stackpole to be the only British site at which it is possible to reliably record this shield bug.

The seedbug *P. varius* is widely distributed in Europe and northern Asia where it occurs in a wide variety of different habitats (Péricart, 1998 & 2001). In the UK it is confined to coastal sand dunes where it occurs in small, localised colonies in areas with sparse vegetation and bare ground. Its exact host plant requirements are uncertain but it has been associated with Little Mouse Ear *Cerastium semidecandrum*,

Biting Stonecrop *Sedum acre*, Common Stork's-bill *Erodium cicutarium* and Shepherd's-purse *Capsella bursa-pastoris*. Modern records are restricted in the UK to Kent, Glamorgan and Pembrokeshire (Kirby, 1992a). It was first recorded in Wales from Freshwater West in 1938 and was last recorded ten years ago on the Gower Peninsula. It has been widely recorded across Stackpole NNR and also from Broomhill Burrows and Freshwater West on the Castlemartin Peninsula (Howe, 2004).

SURVEY LOCATIONS AND DATES

A total of 57 sampling locations across four dune complexes were visited by S. Judd and C. Felton between 8–12.viii.2003 and 8–9.ix.2004. Aerial photographs were used to assess and target areas of bare and partially vegetated ground within fixed and semi-fixed dune habitat. The survey sites were:

Freshwater East (26 ha).

A popular holiday location where over 60% of the non-developed dune habitat is secondary woodland and scrub. Rabbit-grazed relict grey dunes occur on middle and lower slopes behind a yellow dune ridge, on undulating, almost hummocky ground with hollows. These have a characteristic short, herb-rich, turf with substantial patches of Wild Thyme *Thymus polytrichus*, bryophytes and lichens, and are criss-crossed by sandy tracks. Sandy areas on the relict grey dunes are confined to rabbit scrapes and footpaths. Some of these support small plants of Common Stork's-bill.

Stackpole NNR (110 ha).

This complex site includes fixed dune grassland and semi-fixed dune, including perched dunes on Stackpole Warren, semi-fixed dunes to the rear of Broadhaven and Barafundle Bay (the latter with significant scrub encroachment), and excavated limestone slopes of Mere Pool Valley (Plate 1, Fig. 1) with areas of sand remaining over some rock-faces. Open, rabbit-grazed lichen heath has developed over several small, scattered areas of open sand/shallow limestone soils on Stackpole Warren and Mere Pool Valley slopes. The remaining open areas result from wind erosion, grazing/burrowing rabbits and human trampling along footpaths. The 'perched' dune grassland is grazed by sheep and a small herd of Welsh Mountain ponies.

Castlemartin Army Training Estate (190 ha).

Comprising Linney, Brownslade and Gupton Burrows and dominated by fixed and semi-fixed dune communities with predominantly wind-blown sand over limestone. Most open sand habitat results from rabbit grazing pressures (augmented by winter sheep and cattle grazing), military activities and sand extraction. Fresh sand supply is very limited but the dunes are still possibly being fed by small amounts of wind blown sand.

Broomhill and Kilpaison Burrows SSSI (201 ha).

One of Pembrokeshire's largest dune systems (Plate 1, Fig. 4). Species-rich dune grassland overlying Old Red Sandstone is especially well represented. Broomhill Burrows was managed as a rabbit warren until myxomatosis decimated the rabbit population in the mid 1950s. Cattle grazing and a recovery in the rabbit population have checked the spread of scrub and bracken. Rabbit activity have created a patchwork of bare sand in the grey dunes, which with abundant mosses and lichens, provides important habitat on south-west facing upper slopes. There has also been localised quarrying and ploughing across the site.

RESULTS

Third instar nymphs and both living and dead adults of *O. fuliginosa* were recorded from 20 locations at six sites on the Castlemartin Peninsula, south-west



Fig. 1. Habitat for *Odontoscelis* and *Pionosomus* at Mere Pool Valley, Stackpole.



Fig. 2. Adult *Odontoscelis fuliginosa* on Storks-bill. Note: adults and nymphs were typically found under the plant and partially buried in sand.



Fig. 3. Adult *Pionosomus varius*.



Fig. 4. Typical rabbit-grazed dune habitat in the foreground at Broomhill and Kilpaison Burrows.

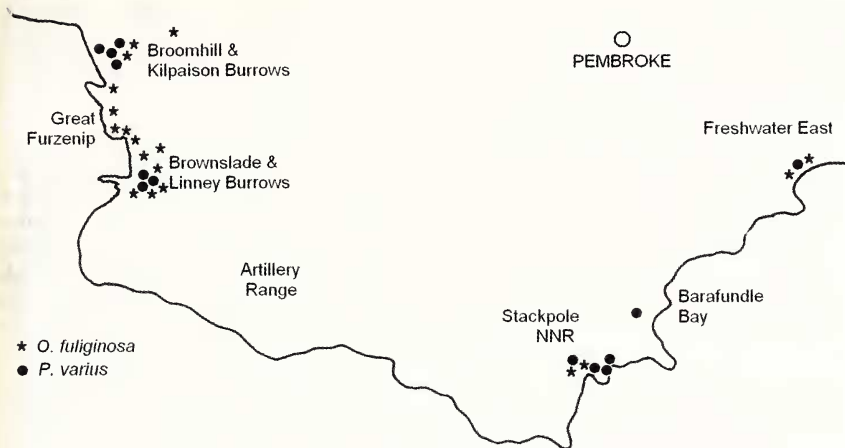


Figure 1. Distribution of *Odontoscelis fuliginosa* and *Pionosonius varius* on the Castlemartin Peninsula in 2003–2004.

Wales (Fig. 1, Appendix 1). Records for Gupton and Brownslade Burrows, Great Furzenip Cliffs, Linney Burrows and Freshwater East represent new sites for this species. *Odontoscelis* was not recorded from Barafundle Bay and is probably lost to this site.

The shieldbug is psammophilous and was recorded from a wide variety of open sandy habitats created by rabbit grazing, erosion, quarrying, military activity and trampling by walkers. Adults were strongly, but not exclusively, associated with Stork's-bill. Nymphs were only found under this plant. Typical habitat with Stork's-bill included eroded bare areas of sand alongside rabbit burrows in very short, tight, thyme-dominated, fixed dune sward; bare sand exposures in fixed dune grassland; bare sandy areas in a large abandoned sand quarry; the eroded edge of a sandy path through fixed dunes; and a fixed, high dune slope with scattered vegetation.

Habitat where Stork's-bill was apparently absent, but where adults were recorded, included soft-rock cliff habitat with exposures of sand; the almost vertical side of a limestone escarpment with wind-blown sand; a 20 m high, south-facing, dune slope with burnt Marram *Ammophila arenaria* and 60% bare sand; and bare sand on rocks above the sea.

Adults and fifth instar nymphs of *P. varius* were recorded from 13 locations at four sites on the Castlemartin Peninsula (Fig. 1, Appendix 2). Records for Linney Burrows and Freshwater East represent new sites for this species. It was recorded from south, or south-west facing, cattle and rabbit-grazed, fixed dune slopes of 30–45°, in very short, tight, thyme-dominated sward with other herbs such as Squill *Scilla verna*, Birdsfoot Trefoil *Lotus corniculatus*, Autumn Hawkbit *Leontodon autumnalis*, Salad Burnet *Sanguisorba minor* and Lady's Bedstraw *Galium verum* together with moss carpet and ca. 10–20% bare sandy patches.

Marram dominated, mobile dunes were not suitable habitat for either of the target species. Recently tilled fields provided large temporary areas of open sand which, when left fallow, develop extensive and in places almost monocultures, of Stork's-bill. However, these appeared too ephemeral to support breeding populations of

Odontoscelis, presumably the presence of *Erodium* at a site must be predictable over time, and are also unsuitable for *Pionosomus*. *Odontoscelis* was also absent from what appeared to be optimal bare sand habitat with Storks-bill on Stackpole Warren.

DISCUSSION

A dramatic decline in disturbance has occurred on the Castlemartin sand dunes in south-west Wales resulting in a significant loss in the extent and quality of bare and partially-vegetated ground. This is due to a decrease in rabbit numbers, cessation of military activity (at Stackpole), absence of a fresh sand supply, planting of conifers, development of woodland and scrub, introduction of exotic species and encroachment of Bracken *Pteridium aquilinum*. Currently, the availability of bare and partially vegetated sand ranges from <5% at Stackpole NNR and Broomhill and Kilpaison Burrows SSSI to 15% on Castlemartin Army Training Estate.

Despite the decline in available habitat, both *Odontoscelis* and *Pionosomus* are widely distributed across the dune systems on the Castlemartin Peninsula. The only localised extinction appears to have been for *Odontoscelis* at Barafundle Bay and this is balanced against new findings for both species at Freshwater East and for *Odontoscelis* at Brownslade and Linney Burrows. It was most surprising that *O. fuliginosa* was not recorded in what appeared to be optimal bare sand habitat with Stork's-bill habitat at Stackpole Warren. The long-term survival of both species is dependent on the provision of a more dynamic dune system with larger areas of bare sand and short, herb-rich, rabbit-grazed grassland within semi-fixed dune habitat. Ideally, management should aim to retain at least 10–15% of semi-fixed dune habitat at each site as bare or partially vegetated sand.

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Appendix 1. *Odontoscelis fuliginosa* records for Castlemartin Peninsula in 2003–2004**Broomhill and Kilpaison Burrows**

1 adult	10.ix.03	SM882006	Eroded bare areas of sand by rabbit burrows with small and limited numbers of <i>Erodium</i> plants at edges. On south-west facing, 30–45 cattle- and rabbit-grazed slope with a very short, tight, thyme dominated sward.
1 dead adult	10.ix.03	SM889004	Island of exposed, ca. 50% bare sand, facing the sea, with <i>Euphrasia</i> and Stork's-bill, surrounded by cattle-grazed dune grassland with ca. 90–100% vegetation cover.
1 third instar	10.ix.03	SM890001	Eroded edge of sandy path with scattered vegetation including Stork's-bill and 50% bare sand.
1 third instar	10.ix.03	SM900007	Under small amounts of Stork's-bill on bare sandy areas to the Refinery side of a large abandoned sand quarry.

Great Furzenip

2 pitfallen adults	5–14.vi. & 14.vi.– 2.vii.03	SR888986	Soft-rock cliff habitat with no obvious Stork's-bill (recorded during a survey of soft-rock cliff habitat undertaken earlier in the year).
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Gupton and Brownslade Burrows

1 adult	–.vi.03	SR888987	Under Stork's-bill in a sand scrape above cliffs and amongst closed turf grassland.
3 adults & 1 third instar	11.ix.03	SR890984	45°, sea-facing, rabbit-grazed slope with sandy exposures and dense, short, thyme sward with barer mossy areas.
1 third instar	11.ix.03	SR897985	Quarry floor (sand extraction stopped in 1990) with very sparse vegetation and 50–90% bare sand and some wet, damp patches. Under Stork's-bill.
1 adult	10.ix.03	SR895978	Fixed, high dune slope ca. 200 m from lake, with scattered Marram, Bugloss, Wild Carrot and some dominant patches of Yarrow.
1 adult & 2 third instars	11.ix.03	SR897977	South facing sand scrape with invading Dewberry and also scattered Bugloss, Carrot and Hawkbit.

Linney Burrows

1 instar 3	12.ix.03	SR893974	Small rabbit scrape with Stork's-bill.
1 adult	12.ix.03	SR890971	20 m high, south-facing, dune slope with burnt Marram and 60% bare sand, Marram, Dewberry and Wild Carrot.
3 adults	12.ix.03	SR891971	Under Yellow Melilot, Marram and Birds-foot Trefoil.
7 third instars & 1 second instar	11.ix.03	SR894971	Under Stork's-bill in small, rabbit produced, sand scrape of ca. 15 m ² with 50% bare sand and Bugloss, Restharrow Burnet Rose and Dock.

Stackpole Complex

1 adult fragment	10.ix.03	Mere Pool Valley SR974943	Ca. 10 m up the side of limestone scarpment with wind-blown sand and ca. 40% bare sand and short vegetation of Birds Foot Trefoil, Hawkbit and Knapweed. No Stork's-bill recorded at all. Remaining areas more thickly vegetated but still short.
1 adult and 3 third instars	12.ix.03	Mere Pool Valley SR974943	Ca. 10 m up the side of limestone scarpment – using suction sampler. Small Stork's-bill and scattered vegetation in ca. 60% bare mossy areas.

(continued)